

**LFG CONTRIBUTIONS IN SECOND
LANGUAGE ACQUISITION RESEARCH:
THE DEVELOPMENT OF CASE
IN RUSSIAN L2**

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Abstract

Learning a second language (L2) is a complex task, involving cognitive and affective factors, both personal and social. Hence theories of Second Language Acquisition (SLA) are many and varied. Among them, Processability Theory (PT) offers a principled transitional paradigm that deals specifically with grammatical development (cf. Pienemann, 1998; Pienemann, Di Biase & Kawaguchi, 2005). In this paper we will illustrate how LFG contributes substantially to the formulation of PT's developmental hypotheses. Specifically it provides PT with two fundamental concepts, ensuring that the different parts of a sentence fit together: the different syntactic (i.e., lexical, phrasal or sentence) levels within or across which their elements require unification; and the different kinds of correspondences among a-, c- and f-structures. Furthermore, within the PT framework, we will investigate the development of case in Russian L2. In this respect, the original proposal that we wish to make here is that King's (1995) descriptive account of case assignments in Russian can also be applied in a developmental perspective. In particular, we will show that King's four types of case assignments (semantic, configurational, lexical and grammatical functions) can be successfully interfaced with PT's stages for the development of case, and thus constitute a helpful resource for a better understanding of the learners' developmental process. Our hypotheses are then tested on cross-sectional data collected among 12 learners of Russian L2 at different proficiency levels and from a varied L1 background.

1 Introduction

In the first section of this paper we will briefly present the framework of Processability Theory (PT, cf. Pienemann, 1998; Pienemann, Di Biase & Kawaguchi, 2005; Bettoni & Di Biase, in preparation), and illustrate LFG's significant contribution to the formulation of its developmental hypotheses for syntactically-motivated morphology and pragmatically-motivated syntax. The remainder of the paper is then organised as follows. Section 2 discusses case in LFG with special attention to Nordlinger's Theory of Constructive Case and King's classification of case assignments in Russian. Section 3 presents the main characteristics of the Russian case system. In Section 4 we show our developmental hypotheses for Russian L2 and introduce our new proposal to incorporate King's classification of case assignments into our PT-based hypotheses. Section 5 will then provide supporting evidence for our hypotheses coming from a cross-sectional study of 12 learners of Russian L2 at different proficiency levels and from a varied L1 background.

2 Processability Theory

Processability Theory is a Second Language Acquisition (SLA) theory of grammatical development. It is cognitively founded (hence applicable to any language), formal and explicit (hence empirically testable), and extended, having not only formulated and tested hypotheses about morphology and syntax, but also paved the way for further developments at the interface between grammar and the lexicon and other important modules in SLA (Bettoni & Di Biase, in preparation). The theory was born in 1998, after Pienemann's first publication on PT. Since then, the theory has grown exponentially and widened its scope, especially thanks to Pienemann, Di Biase and Kawaguchi (2005), who incorporated new theoretical LFG work, such as the Lexical Mapping Theory by Bresnan (2001), which add a discourse-pragmatically motivated syntactic component to its first syntactically-motivated morphological module.

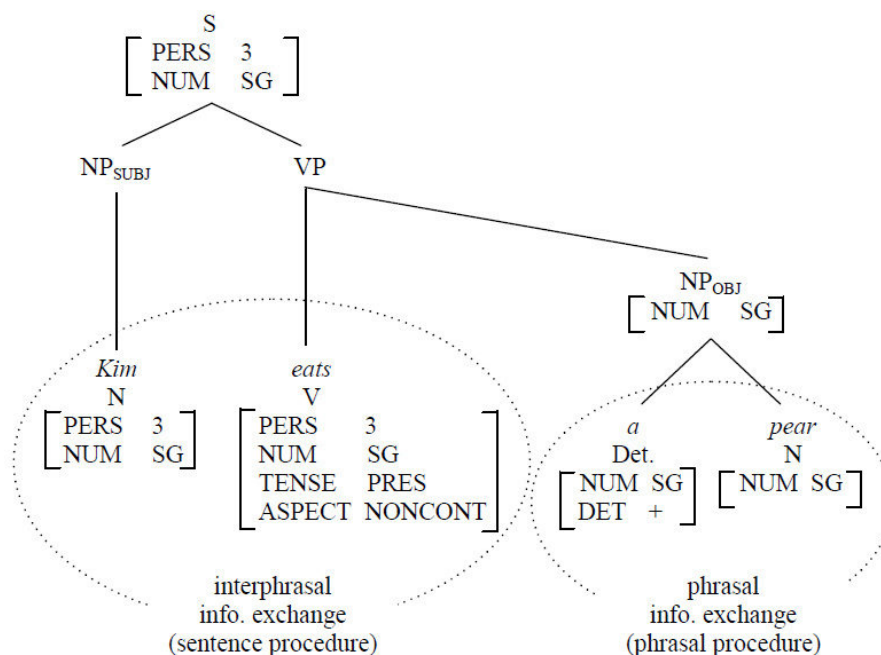
The underlying logic of PT is that at any stage of development learners can produce only those L2 forms which the current state of their language processor can handle (Pienemann, 1998). Hence it hinges on two formal models to account for – and interface – (a) language production, namely how the processor handles language, and (b) linguistic knowledge, namely what languages are like. For language production, PT relies on Levelt's Model (1989), a dynamic model which accounts for online language processing and within human psychological constraints, such as word access and human memory. It is precisely for linguistic knowledge, then, that PT relies on LFG. Notice that Levelt's Model and LFG interface successfully because (i) they are both lexicalist; (ii) they both aim at psychological plausibility; and (iii) Levelt himself bases his Model's lexicalist approach on LFG's non-derivational architecture.

Levelt's Model provides PT with the sequence in which grammatical procedures are activated. Following Kempen & Hoencamp's (1987) Incremental Procedural Grammar, Levelt (1989) maintains that grammatical encoding in mature monolingual speakers unfolds in this sequence:

- a. the lemma
- b. the category procedure
- c. the phrasal procedure
- d. the sentence procedure

Upon selecting the lemma, the category procedure is instigated, assigning a lexical category to the lemma. Then the category of the head lemma will instigate a phrasal procedure, resulting in a phrase. By means of the activation of the sentence procedure, phrases in turn will acquire their functions according to the syntactic frame of their head lemmas. This process is illustrated in the following tree representation.

(1) An illustration of the processing hierarchy for Kim eats a pear



Notice that the notion of information exchange between the items sharing the same attribute-value pairs at f-structure is borrowed from the LFG concept of 'feature unification'.

It is also important to note that the four-step sequence mentioned above is:

- implicational. This means, for example, that in order to activate the phrasal procedure, both the lemma and the category procedures must be activated, but that the sentence procedure need not be active;
- incremental. This means that all processors can operate simultaneously in parallel, but they all work independently on different language fragments of the utterance under construction. Implicit in Levelt's Model is the different cognitive cost required by different utterances.

PT's essential intuition is that the implicational hierarchy of the grammatical encoding process hypothesised by Levelt is reflected in the sequence in which learners acquire the grammatical structures of the L2. More specifically, with regard to morphological development, PT hypothesises that the availability of increasingly more demanding processing procedures defines the learners' progress through a sequence of stages which

depend on the increasingly greater syntactic distance between the linguistic elements requiring feature unification. This universal sequence is shown in the table in (2), to be read from bottom to top.

(2) Hierarchy of processing procedures – morphological development (according to Pienemann 1998)

STAGE	t1	t2	t3	t4
4. SENTENCE PROCEDURE	–	–	–	interphrasal information exchange
3. PHRASAL PROCEDURE	–	–	phrasal information exchange	+
2. CATEGORY PROCEDURE	–	lexical form variation	+	+
1. WORD/LEMMA ACCESS	invariant forms & formulas	+	+	+

At the beginning, the only procedure L2 learners can activate is the access to the lemma. Thus they can produce only formulas and single words without formal variation. The main reason for this inability is that at this earliest stage the L2 lexicon is hardly annotated.

At the category procedure stage, learners begin to annotate their lexicon, and develop a system of lemmas whereby lexical concepts acquire first a syntactic category and later its subcategorisation diacritic features. At this stage, then, formal variation begins to emerge. The first category distinction that learners would tend to make is that between nouns and verbs; and the early values to be distinguished usually relate to the number feature for nouns, and the aspect/tense feature for verbs. However, whatever grammatical information is thus annotated, it does not carry beyond the word level. Because there is no exchange of information taking place, nothing is stored for further use somewhere else in the sentence.

With the next step forward learners reach the phrasal procedure stage. As the lexicon grows in number of items, learners add further diacritic features to their entries, and begin to distinguish categorically also adjectives and determiners from nouns, auxiliaries from lexical verbs, etc. At this stage, crucially, learners are able to distinguish the phrasal head from other

elements within it and to produce phrasal agreements by checking the compatibility of the attribute-value pairs of the phrasal head against those of the dependent(s).

Finally, at the sentence procedure stage, learners are able to fully recognise the grammatical relations expressed by the constituents in the clause. In order to achieve this, the phrase needs to be attached to the S(entence)-node (that is, the mother node in the tree structure), with the sentence procedure determining the functional destination of the NP associated with the argument roles of the verb, such as NP_{SUBJ} or NP_{OBJ}. This implies that learners are now able to produce interphrasal agreements by checking the compatibility of the information coming from different phrases – typically from NP_{SUBJ} and VP.

With regard to syntactic development, LFG’s crucial contribution to PT is nowhere clearer than in the 2005 extension of the theory, where two different paths are hypothesised for the development of syntax. The first is spelled out by the Discourse Functions Hypothesis (Bettoni & Di Biase, in preparation), which traces the staged development of syntax away from default solutions in linking c- to f-structure to the full flexibility of nondefault solutions in linking c- to f-structure. The second is described by the Lexical Mapping Hypothesis, which resorts to LFG’s Lexical Mapping Theory to sketch out the staged development of syntax away from the rigidity of default canonicity to the full flexibility of optional choices allowed by the L2 lexicon in assigning GFs to thematic roles. In this study we will only focus on the Discourse Functions Hypothesis, whose universal stages are shown in the table in (3).

(3) PT: Syntactic development based on the Discourse Functions Hypothesis (Bettoni & Di Biase, in preparation)

STAGE	STRUCTURES
3.	TOP _{XP} marked orders
NONCANONICAL WORD ORDER	FOC _{XP} marked orders
2.	TOP _{XP} SVO / SOV / ...
XP _{DF} CANONICAL WORD ORDER	FOC _{WH-} SVO / SOV / ...
1.	SVO / SOV / ...
CANONICAL WORD ORDER	
single words; formulas	

After the single-word and formulaic stage, learners produce sentences with canonical word order.

At the next stage up, in declarative sentences learners will bring about a differentiation between SUBJ and TOP, and will thus be able to assign prominence to additional information in the clause by placing it in the first syntactic position. The less costly choice is that this new constituent be ADJ(unct) rather than an argument of the verb. Furthermore, in constituent questions, learners will be able to front FOC, but at this stage canonical word order will still follow.

At the next stage, the crucial step forward is the topicalisation/focalisation of a core argument other than SUBJ, typically OBJ. What enables this to happen is that the learner can now assign GF to each constituent irrespectively of the fixed position they occupy in the canonical order frame. This makes argument functions other than SUBJ sufficiently independent as to receive, by themselves, the assignment of a discourse function such as TOP or FOC.

3 Case in LFG

A case system is a prominent characteristic of dependent-marking languages. It is traditionally defined, in a general way, as a system marking dependent nominals to the type of relation they bear to their heads in a phrase (Blake, 1994). Case, then, is not a universal feature, as GFs can be identified by at least three different means: (a) case marking, which is the main means used by dependent-marking languages such as Russian, Japanese, and Warlpiri; (b) agreement, which is very productive in Romance languages like Italian and Spanish, where SUBJ and V can agree in person, number, and gender; and (c) word order or position in the phrase structure, used in configurational languages like English. Natural languages can then obviously exploit more than one means to identify GFs; for instance, Russian and Latin present both a rich case morphology and V agreement with SUBJ.

LFG offers a rich set of descriptions of case among typologically different languages. Among them, Nordlinger (1998) explains how in non-configurational languages, once the GF of an NP is unequivocally marked by case or agreement, other orders besides the canonical one can be grammatically acceptable for the three core elements (SUBJ, V, OBJ) in a sentence. This allows speakers to resort to different word orders and organise sentences according to the pragmatic requirements of the TOP-FOC structure of their sentences. Of particular interest for our study is King's (1995) identification of four types of case assignment with specific attention to

Russian: semantic case, configurational case, lexical case, and GF assignment.

Semantic case assignment, as the name itself suggests, occurs when a particular case is associated with a particular semantic role at a-structure. Semantic cases are common across languages (cf. Butt, 2006), but according to King (1995) the only candidate in Russian is the Instrumental case (INST) for <instrument>, as shown in (4).

- (4) ja napisala pis'mo *karandaš-om*
 I wrote letter pencil-INST

Configurational case assignment occurs when a specific case is assigned to a noun appearing in a certain position in phrase structure. In King's view, this occurs in Russian when genitive in N is daughter of NP, as illustrated in (5), and exemplified in (6). Notice that, unlike with semantic case, Genitive is assigned only by position in c-structure, because the genitive sister of N can mark different semantic roles, such as agent, as in (6), possessor, or a quality.

- (5) NP → N(NP)
 ((↓ CASE) = GEN)

- (6) otvet *učenik-a*
 answer pupil-GEN

Lexical case assignment occurs when case is governed by a particular preposition or verb, as formalised in the f-structure rules for prepositions in (7) and for verbs in (9), and exemplified in (8) and (10) respectively.

- (7) u 'at/near' PREP <OBJ>
 (↑ OBJ CASE) = GEN

- (8) u okon
 by windows-GEN

- (9) upravljat' 'manage' V <SUBJ, OBJ>
 (↑ OBJ CASE) = INST

- (10) upravljaet biznes-om
 (s/he) manages business-INST

Finally, case assignment can be determined by GFs. In Russian three GFs require their own default case, namely, nominative (NOM) for SUBJ, accusative (ACC) for OBJ, and dative (DAT) for OBL_{GOAL}, as formalised in (11). The sentence in (11) shows the match between the three cases and their related GFs. This would seem to contradict the rules in (7) and (9). However,

we assume that the rules in (11) are default, whereas the rules in (7) and (9) are specific lexical requirements which can override the default.

- (11) (↑ SUBJ CASE) = NOM
 (↑ OBJ CASE) = ACC
 (↑ OBL_{GOAL} CASE) = DAT

- (12) mal'čik dal Inn-e knig-u
 boy-NOM gave Inna-DAT book-ACC
 'the boy gave Inna a book'

With respect to this last type of case assignment, in our study we will consider only the case marking of the two core functions SUBJ and OBJ. On the other hand, the marking of OBL_{GOAL} is controversial for two reasons. First, care should be taken in determining the GF of DAT constituents, which are treated as OBL_{GOAL} by King (1995), but more recently as OBJ_{GOAL} by Kibort (2013). Second, the semantic restriction related to both OBL_{GOAL} and OBJ_{GOAL} suggests that L2 learners are likely to mark this type of constituents via semantic case assignment by associating DAT directly with the <goal> role at a-structure. These two points deserve further attention before the acquisition of DAT can be incorporated into our analysis.

4 The Russian case system

From a typological point of view, Russian is a language with a low degree of configurationality and a rich morphology that sets it among the dependent-marking languages. As already mentioned, non-configurational languages tend to express f-structure information by morphology rather than position, and case has the main role of constructing syntactic relations among constituents. Thus in Russian case markers on NPs encode GFs, and are almost never positionally predictable. However, Russian has a canonical word order, which is SVO¹, so NOM occurs before V, and ACC after V most often in the input received by learners – precisely 47% of the times in native oral production (Timberlake, 2004). For discourse and pragmatic reasons, however, constituents can occur in different positions, allowing for all the six possible combinations of the three core elements, as in (13) – even though it is important to note that word orders in (13d-f) rely heavily on prosodic features and, being highly marked, are rarely used by Russian L1 speakers (Kallestinova, 2007).

¹ For an alternative view on Russian word order, cf. King (1995), who suggests VSO as the unmarked, pragmatically neutral word order.

- (13) a. Marij-a est kaš-u SVO 'Marija-NOM eats porridge-ACC'
 b. Marij-a kaš-u est SOV
 c. kaš-u est Marij-a OVS
 d. est Marij-a kaš-u VSO
 e. kaš-u Marij-a est OSV
 f. est kaš-u Marij-a VOS

For learners of Russian L2, case is a complex feature to acquire. There are six cases: nominative, genitive, dative, accusative, instrumental, prepositional, which are fusionally enmeshed with other nominal features such as number (singular or plural), gender (masculine, feminine or neuter), animacy, and class.

The table in (14) shows the full case-marking paradigm for Russian. As we can see, overall, the many-to-many relations between cases and markers are noteworthy.

(14) Russian case-marking paradigm – Nouns (after Kempe & MacWhinney 1998)

	S I N G U L A R				
	MASCULINE		NEUTER	FEMININE	
	ANIMATE	INANIMATE		1 ST CLASS	2 ND CLASS
NOM	-∅	-∅	-o/-e	-a/-ja	- ² ∅
GEN	-a/-ja	-a/-ja	-a/-ja	-y/-i	-i
DAT	-u/-ju	-u/-ju	-u/-ju	-e	-i
ACC	-a/-ja	-∅	-o/-e	-u/-ju	- ² ∅
INST	-om/-em	-om/-em	-om/-em	-oj/-ej	- ² ju
PREP	-e	-e	-e	-e	-i
	P L U R A L				
	MASCULINE		NEUTER	FEMININE	
	ANIMATE	INANIMATE		ANIMATE	INANIMATE
NOM	-y/-i	-y/-i	-a/-ja	-y/-i	-y/-i
GEN	-ov/-ev/-ej	-ov/-ev/-ej	-∅ /-ej	-∅/-ej	-∅/-ej
DAT	-am/-jam	-am/-jam	-am/-jam	-am/-jam	-am/-jam
ACC	-ov/-ev/-ej	-y/-i	-a/-ja	-∅/-ej	-y/-i
INST	-ami/-jami	-ami/-jami	-ami/-jami	-ami/-jami	-ami/-jami
PREP	-ax/-jax	-ax/-jax	-ax/-jax	-ax/-jax	-ah/-jax
When the stress does not fall on the last syllable, -o and -a are both pronounced /ə/					

5 The developmental hypotheses

As we have previously remarked, case is an important morphological device for marking grammatical relations among constituents, and as such of great interest for PT because the two schedules for morphological and syntactic development presented in § 1 must crucially interface. Thus, unlike in § 1, in § 4.1 we propose to include both morphological and syntactic development in a single table. Our new LFG-based proposal is then presented in § 4.2. Here we hypothesise that King’s case assignments discussed in § 2 can be interfaced with PT’s stages for the development of Russian case.

5.1 PT-based hypotheses for Russian case

In (15) we show our PT-based developmental hypotheses for Russian case.

After the single-word and formulaic stage, as soon as the category procedure becomes operative for morphology, learners are able to distinguish categorially between nouns and verbs. Formal marking of nouns, then, begins to emerge at this stage. Once learners have annotated the case feature in their lexicon, they usually start to differentiate between the NOM and the ACC form of feminine nouns – typically between the –a marker and the –u marker (e.g., *kaš-a* ‘porridge-NOM’ vs. *kaš-u* ‘porridge-ACC’). It is however important to keep in mind that, at this category procedure stage, formal variation triggers no information exchange with further elements in the phrase and/or clause, and is thus restricted within the word. Parallel to the category procedure stage in morphology, at the first syntactic stage learners can only produce sentences with canonical word order, that is, an underspecified SVO sequence with a preverbal N_{NOM} and a postverbal N_{ACC} , as shown in (16).

- (16)
- | | | |
|-------------------------------|------------|----------|
| oxotnik-i | ubit | volk-a |
| hunters-NOM | *kills-3SG | wolf-ACC |
| ‘the hunters *kills the wolf’ | | |

At the next stage up, with regard to morphological development, learners are able to produce phrasal agreements. In Russian this phrasal procedure stage involves a variety of structures. The relevant ones for this study are the agreement within PP, NP and VP. At this stage learners will be able to case-mark Ns within PP as lexically required by the preposition, as exemplified in (17).

- (17)
- | | |
|----|-------------|
| v | Moskv-e |
| in | MOSCOW-PREP |

(15) Developmental hypotheses for Russian case

	STAGE	STRUCTURE	MORPHO-SYNTACTIC OUTCOME	EXAMPLE
Syntax	3. NONCANONICAL WORD ORDER	OVS, OSV, etc.		
			OBJ _{ACC} V SUBJ _{NOM}	<i>knigu čitaet mama</i> [book-ACC reads mum-NOM]
Morphology	3. SENTENCE PROCEDURE	TOP _{OBJ} V-agreement NP _{SUBJ} V-agreement		
Syntax	2. XP _{DF} CANONICAL WORD ORDER	TOP _{ADJ} SVO	ADJ SUBJ _{NOM} V	<i>sejčas Oleg smotrit televizor</i> [now Oleg-NOM watches television]
			V OBJ _{INST/GEN/...}	Oleg upravljaet biznesom [Oleg manages business-INST]
Morphology	2. PHRASAL PROCEDURE	agreement in VP agreement in NP agreement in PP	N N _{GEN}	<i>kniga Olega</i> [book-NOM Oleg-GEN]
			P N _{ACC/GEN/DAT/...}	<i>u ozera</i> [by lake-GEN]
Syntax	1. CANONICAL WORD ORDER	SVO		
			N _{NOM} V N _{ACC}	<i>devočka est' kašu</i> [girl-NOM eat porridge-ACC]
Morphology	1. CATEGORY PROCEDURE	case marking on N e.g., NOM vs ACC/INST		
s i n g l e w o r d s a n d f o r m u l a s				

Within the NP, they will also be able to mark the second NP as GEN, as configurationally required by the 'sister' N, like in (18).

- (18) *život* volk-a
 stomach wolf-GEN

Finally, within the VP learners will be able to check the value of the case feature of NP_{OBJ} against the value of the feature OBJ CASE of V, as shown in (19). If OBJ is marked by its default ACC case in its default postverbal position, the proof of intraphrasal exchange of information remains equivocal. We thus prefer to consider unequivocal proof of progress to this stage when OBJ is marked with cases other than ACC (e.g., INST).

- (19) ona z анимаetsja muzyk-oj
 she-NOM does music-INST
 ‘she practices music’

With regard to syntax, we hypothesise that at this stage learners will be able to place an element other than SUBJ – typically ADJ – in the first position as in (20). This addition in turn will bring about a differentiation between SUBJ_{NOM} and the topical first constituent in the clause.

- (20) zdes' ona ne slyšala sovet-u
 here she-NOM not heard- FEM.SG advice-ACC
 ‘here she didn’t take the advice’

At the last stage of their morpho-syntactic development, learners are able to assign GFs irrespectively of position. As we have seen, in Russian this requires two morphological resources: a head-marking strategy, namely SUBJ-V agreement for the identification of SUBJ; and a dependent-marking strategy, namely case-marking for identifying the two main argument functions – that is, SUBJ and OBJ. With regard to the former strategy, with the activation of the S-procedure, learners can now produce the agreement between the SUBJ features (number and gender) and the predicate. With regard to the latter strategy, still thanks to the activation of the S-procedure, information exchange between V and its complements can now happen across phrases. This crucially occurs when OBJ is displaced to the left of V, requiring learners to case-mark the displaced constituent with ACC as a result of the exchange of information between VP and the external NP, as shown in (21).

- (21) vilk-u prinesla balerin-a
 fork-ACC brought-FEM.SG dancer-NOM
 ‘the fork, the dancer brought it’

At this last stage, then, the interplay between morphology and syntax in the development of case is self-evident. On the one hand, morphology feeds syntax in the sense that only when the S-procedure is firmly in place learners can case-mark constituents unambiguously regardless of word order constraints. On the other hand, along the path for morphological

development, the most convincing proof that case is assigned via interphrasal information exchange is available only when learners are able to free up the rigidity of the canonical word order frame – crucially by choosing to topicalise OBJ.

5.2 The interface with King’s case assignments

The table in (22) illustrates our proposal to interface King’s case assignments with PT’s stages. In particular, we will also show how King’s labels applied to PT’s stages contribute to resolving some of the issues concerning the interface between morphological and syntactic development. For example, recall that at the category procedure stage, learners are able to case-mark constituents without exchanging information with further elements in the clause. This would seem to contradict the fact that a case system crucially marks dependency relations. Furthermore, assuming that at this stage learners can produce sentences of canonical word order, how can they case-mark GFs without exchanging information with the verb?

(22) Interfacing PT’s stages for morphological development (Pienemann, 1998) with LFG’s types of case assignments (King, 1995)

DEVELOPMENTAL STAGE		CASE ASSIGNMENT
Sentence procedure	↔	Grammatical Functions
Phrasal procedure	↔	Lexical / Configurational
Category procedure	↔	‘Proto-configurational’ / Semantic

Unable to compute any information exchange and to disrupt the canonical word order frame, at the category procedure stage, learners can exclusively rely on two criteria to assign case: semantics and position. This leads us to hypothesise that at this first stage, learners can produce:

- semantic case assignment, in the sense that they will map case markers straight onto thematic roles, with NOM assigned to <agent> and ACC assigned to <patient>;
- proto-configurational case assignment, in the sense that, along with semantics, it is syntactic position that leads the way to assigning case, with the preverbal noun marked as NOM, and the postverbal noun marked as ACC.

Readers would appreciate that a few adaptations have been made from King’s original classification presented in § 2. First, King does not consider NOM to <agent> and ACC to <patient> as evidence of semantic case assignment, because in target Russian these cases are assigned in direct association with GFs. However, the point we wish to make here is that learners at this stage of development will treat case semantically rather than grammatically, and thus undergo the same type of case assignment as that presented in (4) in § 2. As for INST on <instrument>, which King proposes as the sole instance of semantic case assignment in Russian, we consider it as structurally belonging to this stage (requiring no information exchange), but virtually unlikely to emerge for two reasons: on the one hand, it occurs rarely in the input for L2 learners; on the other hand, it is used to mark ADJs, and at this stage, learners’ utterances tend to be short, including mostly argument functions. Secondly, we adopt here the label ‘proto-configurational’ rather than simply ‘configurational’ as King suggests, because canonical word order at this stage is minimally specified (Pienemann, Di Biase & Kawaguchi 2005), in the sense that the learners’ c-structure is not yet organised hierarchically, and constituents are purely sequenced onto a flat c-structure.

With the activation of the phrasal procedure, we hypothesise that learners can produce:

- configurational case assignment, when they mark the NP by GEN in the structure $NP \rightarrow N(NP)$;
- lexical case assignment, when they assign case as lexically required by verbs or prepositions.

Notice that, with regard to lexical case assignment, we do not assume that all the particular cases required by the verb/preposition lexical entries will be learnt at the phrasal procedure stage. In fact, they will have to be learnt individually. We simply hypothesise that, once learners have annotated these cases as values of the OBJ CASE feature in their lexicon, they will need an operative phrasal procedure to produce lexical case assignment.

With the activation of the sentence procedure, then, we hypothesise that learners will produce GF assignment irrespectively of position.

Finally, we would also like to remark that we assume this developmental hierarchy of case assignments to hold cross-linguistically, with the only exception of configurational case assignment, whose position in the hierarchy is inevitably language specific.

6 Testing the hypotheses

The evidence we bring to test our PT-based hypotheses and their interface with King’s case assignments comes from a cross-sectional study of 12

learners of Russian L2, four males and eight females, at different proficiency levels. Their L1 background is quite varied and includes Italian, Serbian, Azeri, and Georgian. Their exposure to Russian also varies a great deal: some of them have learnt Russian at university, with very limited L2 input; others have learnt it in an immersion situation in a Russian speaking environment, with extensive L2 input. We used five conversational tasks to elicit the structures targeted in our developmental hypotheses. Among them are transitive structures, prepositional phrases, lexical verbs requiring OBJ to be marked by cases other than ACC, and OBJ topicalisations.

Our analysis in this study includes a total of 1023 unequivocally case-marked nouns and pronouns. We have thus excluded from our corpus all the nouns and pronouns that do not exhibit formal variation for case, e.g. neuter nouns ending in -Ø, which can be both NOM and ACC. The table in (23) illustrates the distributional analysis of the case markers among learners, structures and stages. The learners are listed horizontally from the least proficient to the most advanced one.

The structures are listed vertically as in our PT-based hypotheses, and the numbers in the same row indicate their occurrences. Furthermore, for evidence of progress to a stage we follow Pienemann, Di Biase & Kawaguchi (2005), who require one instance of a structure, provided we are convinced that our case-marked GF is processed online in a non-formulaic way; and Pallotti (2007), who requires evidence of systematic and productive use of the target structure.

All our learners can produce preverbal Ns marked as NOM. This is not surprising, as NOM is the unmarked default case. Ten of them can also mark postverbal Ns as ACC in a convincing number of structures as in (24), and hence they have safely reached the category procedure stage for morphology and the canonical word order stage for syntax.

- (24) JO: ona uvidet *babušk-u*
 she-NOM see-3SG grandmother-ACC

As expected, the least proficient learners are more inaccurate in marking the postverbal N as ACC. As the example in (25) shows, inaccuracy comes about by the use of the default NOM marker.

- (25) EL: *babušk-a* smotret *volk
 grandmother-NOM watch-3SG *wolf-NOM

Less convincing is the number of occurrences for INST semantic case. In fact, only two learners (AL and MT) attempt to produce it, and only MT, who is among the most proficient ones, can mark it correctly by INST, as exemplified in (26), whereas AL falls back on the default NOM.

(23) The development of Russian case – cross-sectional data

PT STAGES	CASE ASSIGNMENTS	STRUCTURES	EV	AL	JO	MA	EL	CA	LI	CR	AB	MT	BI	BB
Sentence procedure	Grammatical Functions	OBJ _{ACC} V (SUBJ)	-4	-4	-3	-4	-4	-4	-5	+3-1	+4	+4	+5	+8
		ADJ SUBJ _{NOM} V (OBJ)	/	/	/	/	/	+4	+10	+5	+16	+6	+14	+5
	lexical	V OBJ _{INST}	-1	-2	-2	-2	+1 -1	+1 -1	+2	+1-1	+2	+2	+1	+2
Phrasal procedure	configurational	N N _{GEN}	-3	-1	/	+2	+1-1	+1	+9-1	+1	+5	+5	+7-2	+3
	lexical	P N _{GEN/ACC/L}	-13	-25	+11	+4-8	+14-12	+15-13	+18-5	+27-3	+39-13	+17-4	+22-1	+43-1
Category procedure	semantic	N _{INST}	/	-1	/	/	/	/	/	/	/	+2	/	/
	proto-configurational	V N _{ACC}	-9	-14	+12	+5-2	+6-5	+3-1	+11-2	+10-2	+7-6	+10-2	+11-2	+13
	& semantic	N _{NOM} V	(+30)	(+26)	(+31)	(+32)	(+40)	(+25)	(+32)	(+37)	(+45)	(+28)	(+33)	(+42)
+ = correctly case-marked - = incorrectly case-marked / = lack of context Numbers in brackets are irrelevant for determining the learners' progress														

(26) MT: oni *režut* *život* volk-a *nož-om*
 they-NOM cut-PL stomach wolf-ACC knife-INST

Thus, although statistically irrelevant for this structure, our data would seem to suggest that this instance of semantic case assignment tends to be acquired late. However, this would not contradict our developmental hypothesis because, as we have discussed in § 4.2, we are inclined to ascribe its apparently late acquisition to reasons other than structural complexity.

These ten learners also show evidence of having reached the next stage up, which for morphology involves lexical case within PP, configurational case within NP, and lexical case within VP. There is, however, significant variation in the distribution of the different constructions belonging to this second stage. They can all produce lexical case assignment as required by P, even though some inaccuracy remains also among the more advanced learners, as shown in (27). This can be explained by the complex and many-to-many relationship between Ps and the cases they require.

(27) AB: volk *prišlo k *dom-a
wolf-NOM *arrived-NEUT.SG at *home-GEN
k 'at' PREP <OBJ>
(↑OBJ CASE) = DAT

Nine of the ten learners can also produce configurational case assignment within NP, as exemplified in (28).

(28) LI: cvet stul-a
 colour-NOM chair-GEN

Only eight of them can also produce lexical case assignment in VP. In our corpus, this structure requires OBJ to be marked by INST, as in (29). The four learners who fail to mark OBJ by INST either produce a default NOM or mark the OBJ by ACC, thus relying on semantic and proto-configurational strategies.

(29) MT: ona zanimaetsja muzyk-oj
 she-NOM does-3SG music-INST

The distribution of these three structures among the ten learners seems to reveal further steps within the stage, unfolding in the following sequence: lexical case within PP, configurational case within NP, and lexical case within VP. It should be noted, however, that this further sequence is by no means assumed to be universal. In fact, it is both language-specific, since configurational and lexical case assignments vary across languages, and somewhat ‘learner-specific’, since lexical case assignment also depends on

the attribute-value pairs that learners must annotate in their lexicon with respect to Ps, Vs and Ns – a less systematic and generalisable component. With regard to syntactic development at this stage, it is interesting to note that only the seven more advanced learners introduce a topicalised ADJ, as in (30). Needless to say, they correctly mark SUBJ as NOM even if it occurs in the sentence second position.

- (30) MT: zdes' ona ne slyšala sovet-u
 here she-NOM not heard-FEM.SG advice-ACC

Five learners (CR, AB, MT, BI, and BB) have also reached the last stage of development and are thus able to produce GF case assignment irrespectively of word order. Hence, they can produce sentences like (31), where OBJ marked as ACC is in preverbal position.

- (31) BB: vilk-u prinesla balerin-a
 fork-ACC brought-FEM.SG dancer-NOM

As we have remarked earlier, OBJ topicalisation in these constructions was deliberately prompted by one of our five tasks, which forced the learners to begin their utterances with the <theme> role. What happens, then, when the learners who have not yet acquired the morphological resources of the last stage are asked to perform this task? The most common solution is to overextend NOM on both the preverbal N and the postverbal N as in (32).

- (32) AL: *vilk-a prines balerin-a
 fork-NOM brought-MASC.SG dancer-NOM

There is however a second less common solution. MA and JO, for example, often tend to mark postverbal SUBJ as ACC, as shown in (33), which is evidence of case assignment only by position.

- (33) MA: *vilk-a prines balerin-u
 fork-NOM brought- MASC.SG dancer-ACC

Both solutions would seem to suggest that when learners have not reached the last stage of development, and more complex syntactic structures are triggered by discourse-pragmatic requirements, proto-configurationality would tend to override semantics in the case-marking process.

7 Conclusion

In this study we have shown how a theoretical model like LFG can be useful in setting hypotheses for second language development, and how it can

contribute in shaping and pushing forward SLA research. First, in a general way, LFG provides PT with a solid and cognitively-founded model for language description, which can be successfully used also to account for the learners' interlanguage. Secondly, the interface we have proposed between our PT-based developmental hypotheses and King's types of case assignment enhances our understanding of the staged development of Russian case by revealing further interesting patterns. The results of our cross-sectional study indicate that learners at different PT stages resort to different strategies to assign case. Specifically, the learners at the category procedure stage tend to assign case on the basis of semantically-motivated and proto-configurational strategies; further up, the procedural resources of the phrasal procedure stage allow learners to produce lexical and configurational case assignments; and finally, only the learners who have safely reached the sentence procedure stage are able to produce GF assignment regardless of word order constraints. Furthermore, when learners attempt to produce structures belonging to stages they have not reached yet, they resort to simpler strategies, such as semantic and proto-configurational case assignments.

Our data confirm the implicational scalability of our developmental hypothesis, and suggest a hierarchical reading of King's classification, as shown in (34), from the easiest to the most cognitive costly type of case assignments.

- (34) Proto-configurational > Semantic > Lexical in PP > Configurational >
Lexical in VP > Grammatical Functions

As this hierarchy is based on PT stages, which have been validated cross-linguistically, we assume it to be universal and thus applicable to any language, with the only exception of Configurational case, which happens to be highly language-specific. However, cross-linguistic evidence would be required to generalise our findings. Further investigation is thus needed in several directions, as well as more substantial proof on more diverse structures in a wider corpus. A fuller developmental hypothesis based on King's (1995) types of case assignment should, first, include the third case-marked argument function, namely the dative OBL_{GOAL} , and secondly, the interface between PT's Discourse Functions Hypothesis and Lexical Mapping Hypothesis, which are two unexplored areas in Russian L2. Finally, we hope that further work on Lexical Mapping Theory will help PT to formulate clearer and wider developmental hypotheses for case.

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